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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/658,393	09/08/2000	Kathrin Berkner	074451.P110	3421

7590

12/09/2005

Michael J Mallie
Blakely Sokoloff Taylor & Zafman LLP
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1026

EXAMINER

LEE, TOMMY D

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/658,393	BERKNER ET AL.	
	Examiner	Art Unit	
	Thomas D. Lee	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9,38-47,84-86 and 119-123 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9,38-47,84-86 and 119-123 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This Office action is responsive to applicant's amendment filed September 20, 2005. Claims 1-9, 38-47, 84-86 and 119-123 are pending.

Response to Arguments

Applicant's arguments filed in response to the rejections of claims 1-9, 38-47, 84-86, 119 and 120 under 35 U.S.C. 102(b) or 103(a) as set forth in the Office action mailed March 15, 2005 have been fully considered but they are not persuasive. Regarding claims 1-9, 38-47, 119 and 120, applicant's arguments are based on the claims as amended. The claims, with the added limitations, are disclosed or suggested by the prior art, as set forth below. As for claims 84-86, applicant asserts that the cited prior art (Abdel-Malek) merely reconstructs the image after thresholding by performing the exact wavelet transform in reverse, which is not "performing denoising by thresholding coefficients generated by applying the forward wavelet transform [and] rescaling coefficients by filtering coefficients after thresholding," as recited in base claim 84 (amendment, at page 9, line 19 – page 10, line 6). However, it was set forth in the prior Office action that Abdel-Malek's threshold processor performs the denoising, and that the rescaling is part of the inverse wavelet process (prior Office action, at page 4, lines 10-13). Applicant discloses rescaling by multiplication of coefficients by a multiplication factor (specification, at page 23, lines 12-13). In Abdel-Malek, each coefficient is multiplied by a multiplication factor (column 6, lines 25-35), thereby providing a rescaling of the coefficients.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 84-86 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,497,777 (Abdel-Malek).

Regarding claims 84-86, Abdel-Malek et al. disclose a method comprising: applying a forward wavelet transform to image data (wavelet transform processor 36 (column 4, lines 21-44)); performing denoising by thresholding coefficients generated by applying the forward wavelet transform (threshold processor 38 (column 5, line 42 – column 6, line 10)); rescaling coefficients by filtering coefficients after thresholding (part of inverse wavelet process (column 6, lines 20-42)). The method further comprises sampling the wavelet coefficients (wavelet coefficients are inherently sampled in threshold process); and applying an inverse wavelet transform on filtered coefficients (inverse wavelet transform processor 42 (column 6, lines 10-18)).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 38-40, 120 and 121 are rejected under 35 U.S.C. 103(a) as being unpatentable over International Publication WO 99/28865 (Decegama) in view of U.S. Patent 5,748,786 (Zandi).

Regarding claims 1, 2, 38, 120 and 121, Decegama discloses a system comprising: a wavelet-based image processing path to enhance an input image in a

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wavelet domain, comprising a forward wavelet transform (multistage wavelet transform filter 50 (page 6, lines 7-23)), one or more wavelet-based processing blocks (enhancement system 10 (page 7, lines 18-22)), and an inverse wavelet transform (multistage inverse wavelet transform filter 22 (page 9, line 27 – page 10, line 20)); and a print engine coupled to the processing path (output device 62 may be a printer (page 5, lines 23-27)). The system further comprises an input operable to receive the input image from an external source and a scanner for generating the input image, wherein the input and the scanner are coupled to the image processing path (signal source 68 may be a scanner; input device may be a keyboard 64)).

Decegama does not disclose a unit to sharpen the input image or smooth data corresponding to the input image, wherein the image processing path further includes a classifier, the classifier to control reduction of image noise, smoothing of the image, and sharpening of the image. Zandi discloses this limitation (column 15, lines 6-27). In view of Zandi, one of ordinary skill in the art would have been motivated to modify the teaching of Decegama by providing a unit for sharpening or smoothing the image data, because such a unit enhances the detail of the output image.

Regarding claims 39, 40 and 122, Decegama discloses a method comprising: processing an input image by enhancing the input image, including applying a forward wavelet transform to create a plurality of coefficients and filtering coefficients with a coefficient domain operator in a wavelet domain (multistage wavelet transform filter 50 (page 6, lines 7-23)); and outputting a processed image (output device 62). The method further comprises: applying one or more wavelet-based processing blocks to

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coefficients resulting from applying the forward wavelet transform (enhancement system 10 (page 7, lines 18-22)); and applying an inverse wavelet transform (multistage inverse wavelet transform filter 22 (page 9, line 27 – page 10, line 20)).

Decegama does not disclose sharpening or smoothing data corresponding to the input image, wherein the processing an input image further includes applying a classifier to the plurality of coefficients prior to thresholding. Zandi discloses this limitation (column 15, lines 6-27). In view of Zandi, one of ordinary skill in the art would have been motivated to modify the teaching of Decegama by providing a unit for sharpening or smoothing the image data, because such a unit enhances the detail of the output image.

Claims 39, 40 and 122 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abdel-Malek in view of Zandi.

Regarding claims 39 and 40, Abdel-Malek discloses a method comprising: processing an input image by enhancing the input image, including applying a forward wavelet transform to create a plurality of coefficients and filtering coefficients with a coefficient domain operator in a wavelet domain (wavelet transform processor 36 (column 4, lines 21-44)); and outputting a processed image (display system 18 outputs processed image (column 6, lines 42-49)). The method further comprises: applying one or more wavelet-based processing blocks to coefficients resulting from applying the forward wavelet transform (threshold processor 38 processes wavelet transform signal (Fig. 2) to remove noise (column 5, line 42 - column 6, line 10)); and applying an

inverse wavelet transform (inverse wavelet transform processor 42 (column 6, lines 10-18)).

Abdel-Malek does not disclose sharpening or smoothing data corresponding to the input image, wherein the processing an input image further includes applying a classifier to the plurality of coefficients prior to thresholding. As mentioned above, Zandi discloses this limitation (column 15, lines 6-27). In view of Zandi, one of ordinary skill in the art would have been motivated to modify the teaching of Abdel-Malek by providing a unit for sharpening or smoothing the image data, because such a unit enhances the detail of the output image.

Claim 119 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,905,579 (Katayama) in view of Zandi.

Katayama discloses a copier having a wavelet-based image processing path for enhancing image data (wavelet transforming circuit 2, edge detecting circuit 3, character detecting circuit 4 (column 3, lines 29-47); for use in a copier (column 1, lines 11-18)).

Katayama does not disclose one or more units to sharpen or smooth data corresponding to the image data. As mentioned above, Zandi discloses this limitation (column 15, lines 6-27). In view of Zandi, one of ordinary skill in the art would have been motivated to modify the teaching of Katayama by providing a unit for sharpening or smoothing the image data, because such a unit enhances the detail of the output image.

Claims 3 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Decegama in view of Zandi and U.S. Patent 5,412,741 (Shapiro).

Neither Decegama nor Zandi explicitly disclose a critically sampled wavelet transform. This type of wavelet transform is well known in the art, as noted by Shapiro (column 1, lines 34-38). Applicant has not disclosed that the use of a critically sampled wavelet transform provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well using any one of a number of well-known wavelet transform processes depending on the image data to be reduce, including the critically sampled wavelet transform, because all wavelet transforms effectively reduce the amount of image data for storage or transmission. Therefore, it would have been obvious for one of ordinary skill in the art to apply a critically sampled wavelet transform to the combined teaching of Decegama and Zandi.

Claims 4, 5, 42 and 43 rejected under 35 U.S.C. 103(a) as being unpatentable over Decegama in view of Zandi and U.S. Patent 6,236,745 (Chen et al.).

Neither Decegama nor Zandi explicitly disclose an overcomplete or Haar wavelet transform. This type of wavelet transform is well known in the art, as noted by Chen et al. (column 3, lines 48-58). Applicant has not disclosed that the use of an overcomplete or Haar wavelet transform provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well using any one of a number of well-known wavelet transform processes depending on the image data to be reduced, including the overcomplete or Haar transform, because all wavelet transforms effectively reduce the amount of image data for storage or transmission. Therefore, it

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would have been obvious for one of ordinary skill in the art to apply an overcomplete or Haar wavelet transform to the combined teaching of Decegama and Zandi.

Claims 6, 7, 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Decegama in view of Zandi and U.S. Patent 6,148,111 (Creusere).

Neither Decegama nor Zandi explicitly disclose a 5,3 or 2,6 wavelet transform. This type of wavelet transform is well known in the art, as noted by Creusere (column 5, line 64 - column 6, line 1). Applicant has not disclosed that the use of a 5,3 or 2,6 wavelet transform provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well using any one of a number of well-known wavelet transform processes depending on the image data to be reduced, including the 5,3 or 2,6 wavelet transform, because all wavelet transforms effectively reduce the amount of image data for storage or transmission. Therefore, it would have been obvious for one of ordinary skill in the art to apply a 5,3 or 2,6 wavelet transform to the combined teaching of Decegama and Zandi.

Claims 8 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Decegama in view of Zandi and U.S. Patent 6,847,737 (Kouri et al.).

Neither Decegama nor Zandi explicitly disclose a complex wavelet transform. This type of wavelet transform is well known in the art, as noted by Kouri et al. (column 32, lines 65- 67). Applicant has not disclosed that the use of a complex wavelet transform provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's

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invention to perform equally well using any one of a number of well-known wavelet transform processes depending on the image data to be reduced, including the complex wavelet transform, because all wavelet transforms effectively reduce the amount of image data for storage or transmission. Therefore, it would have been obvious for one of ordinary skill in the art to apply a complex wavelet transform to the combined teaching of Decegama and Zandi.

Claims 9 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Decegama in view of Zandi and U.S. Patent 6,141,452 (Muran).

Neither Decegama nor Zandi explicitly disclose a limited redundancy wavelet transform. This type of wavelet transform is well known in the art, as noted by Muran (column 3, lines 49-56). Applicant has not disclosed that the use of a limited redundancy wavelet transform provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well using any one of a number of well-known wavelet transform processes depending on the image data to be reduced, including the limited redundancy wavelet transform, because all wavelet transforms effectively reduce the amount of image data for storage or transmission. Therefore, it would have been obvious for one of ordinary skill in the art to apply a limited redundancy wavelet transform to the combined teaching of Decegama and Zandi.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Lee whose telephone number is (571) 272-7436. The examiner can normally be reached on Monday-Friday, 7:30-5:00, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (571) 272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



tdl

December 1, 2005

Thomas D.
~~DOYLE~~
PATENT EXAMINER